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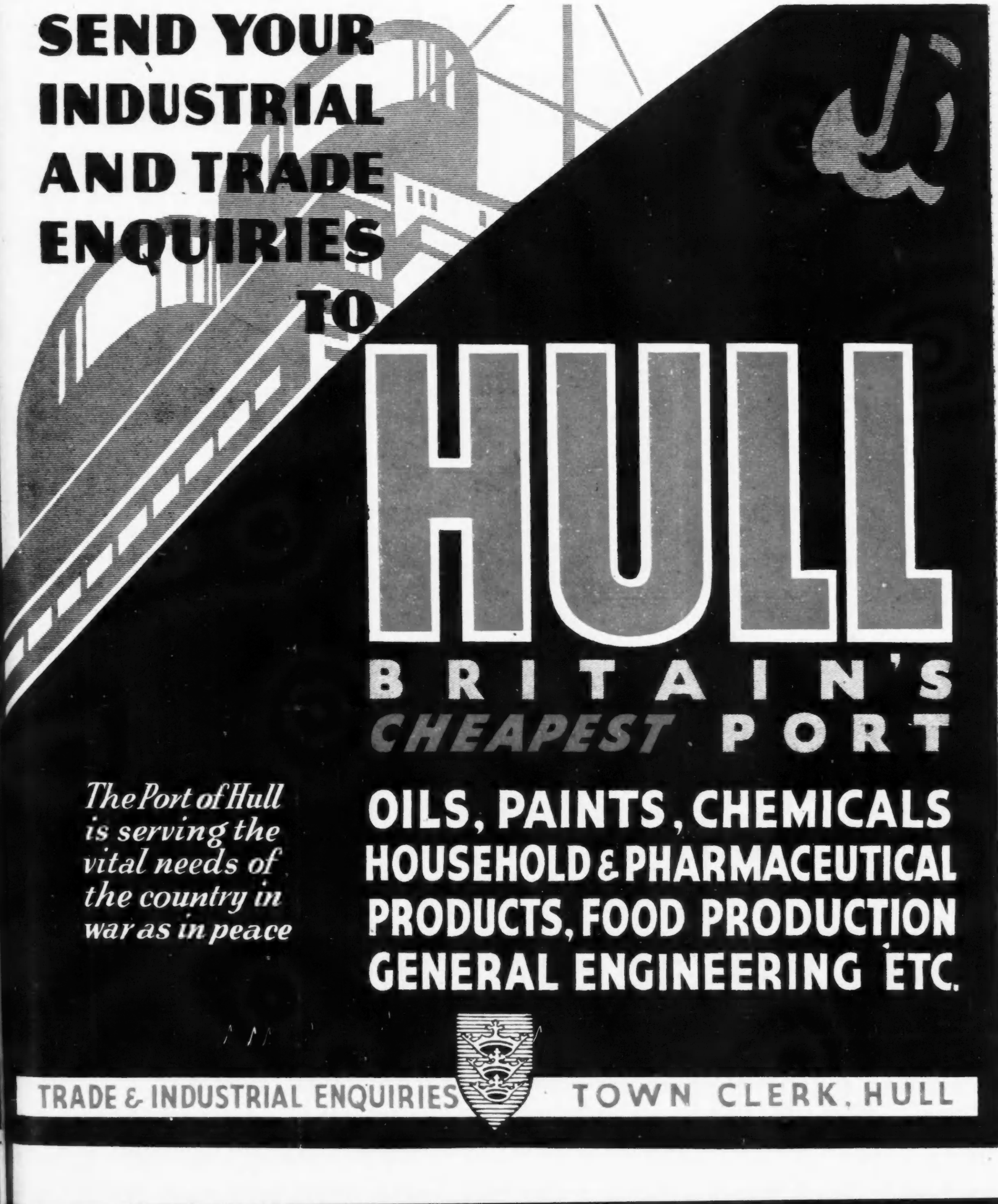
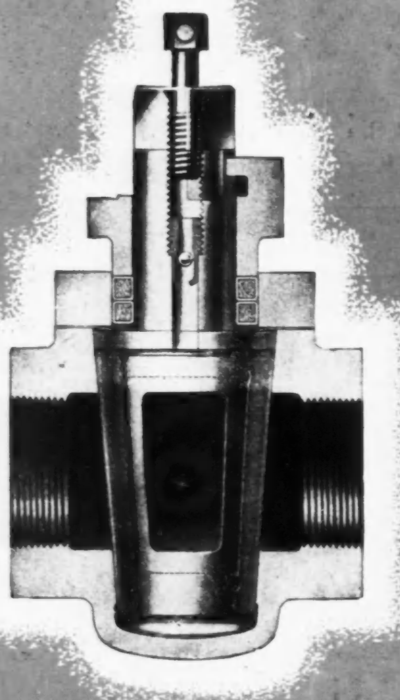
The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XLVI. No. 1186. SATURDAY, MARCH 21, 1942. 6D. PER COPY: POST FREE 8D.

REGISTERED AS A NEWSPAPER





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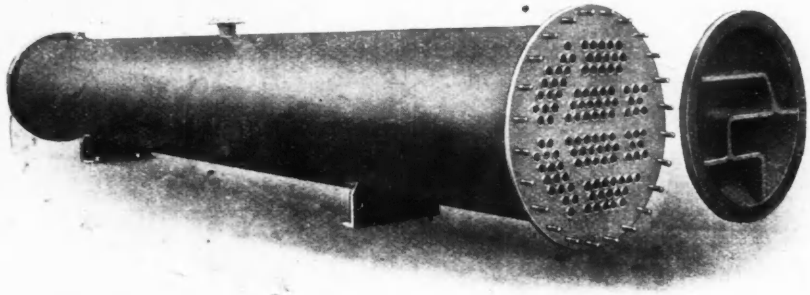

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A

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This page is a monthly feature devoted to announcements in the interests of safety in Works and Laboratories.

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here is a Quick Remedy for
DERMATITIS
AND ALL SKIN TROUBLES

A great number of war workers find skin trouble attacking the hands and forearms. Welfare workers are called upon to deal with cases of dermatitis, cracked, sore or broken skin. The affected parts become red and sore. Often there is fiery irritation. The simplest and quickest way to deal with skin trouble of any kind is to apply D.D.D. Prescription. This soothing antiseptic liquid allays burning irritation and soreness at once and heals the skin rapidly. D.D.D. Prescription is sold by chemists everywhere price 1/5 per bottle.
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Full particulars and sample bottle sent free to Executives and Welfare Workers

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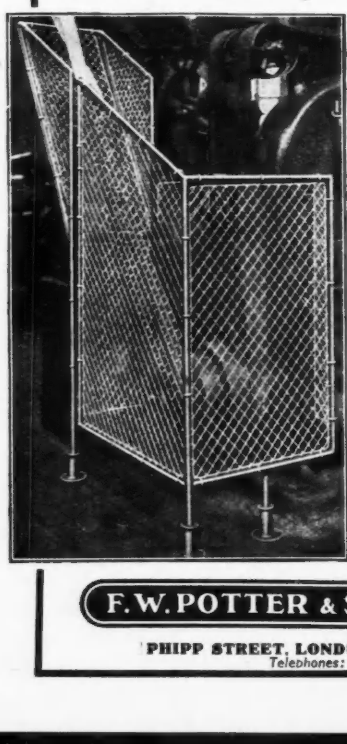

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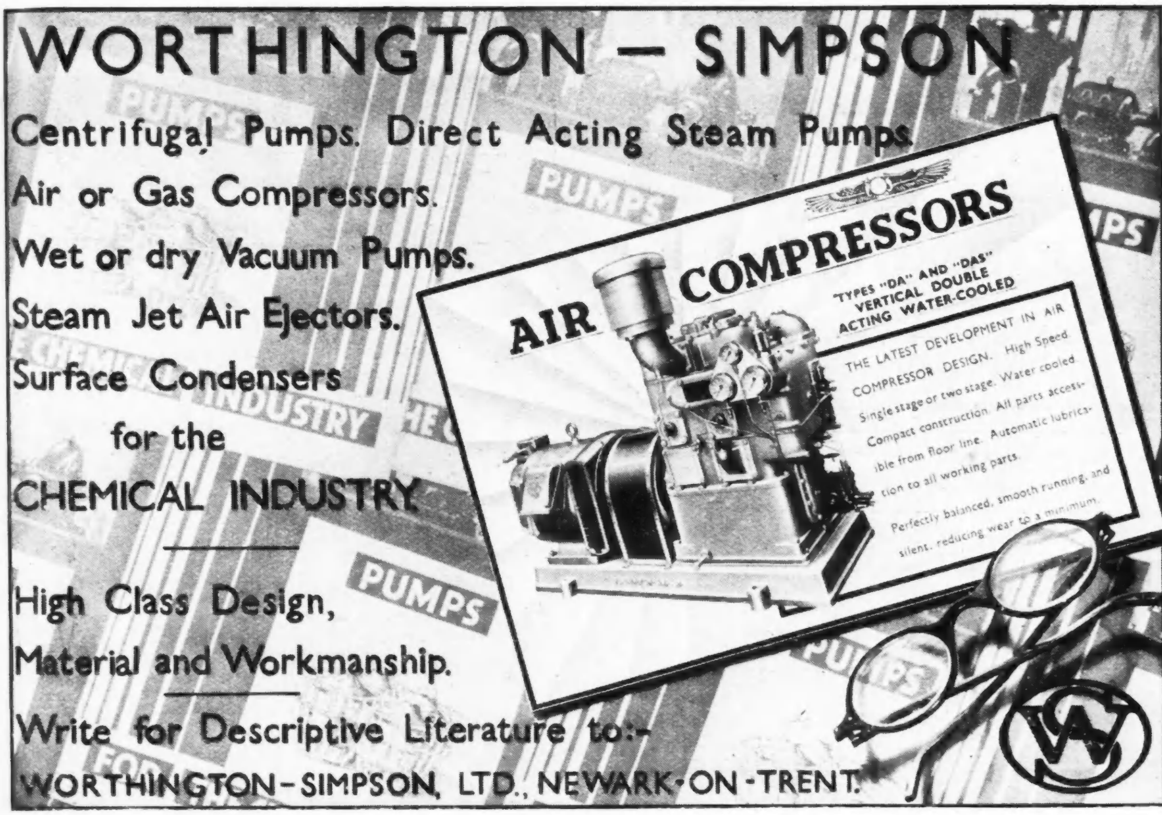

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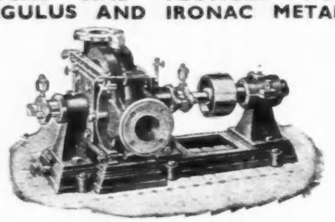

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Teak resists alkalies,
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Also, Teak is ideal for floors where acids, alkalies or water is being slopped about. It doesn't do any of those things it shouldn't do. It just stays put. Nor is it costly, considering the way it lasts.

Teak is Tectona Grandis. Other timbers miscalled 'Teak' are not Tectona Grandis and have not the properties of Teak. Burma Teak is true Teak.

BURMA TEAK
Withstands the Acid Test!

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See that your sandbags are rotproofed before they are filled

Instructions obtainable from

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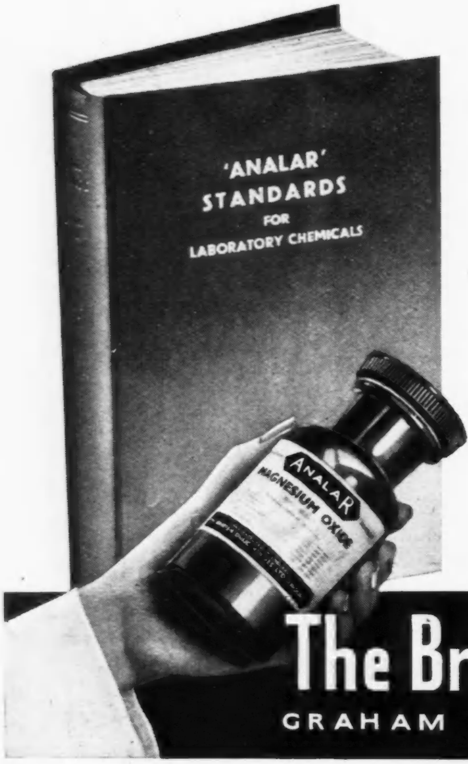

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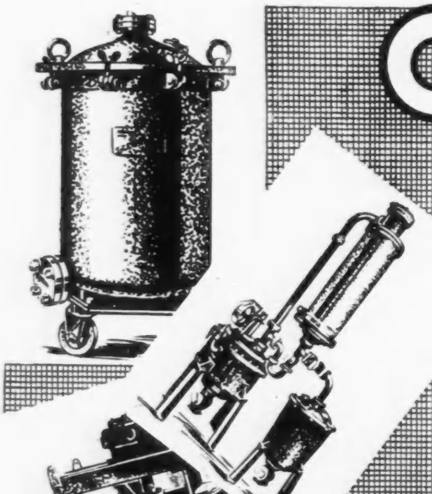

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The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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VOL. XLVI. No. 1186 — March 21, 1942 — Annual Subscription, 21s. Overseas, 26s.

War-Time Publicity and the Technical Press

AMONG the various branches of civilian activity that have been the target for criticism in war time, advertising in the Press has found a prominent place. The criticisms have in the main been due to the official discouragement of spending. Some critics object to almost all advertisements of goods for sale; others take exception to the advertising of firms whose goods are not at present for sale, or are in short supply; and one critic has gone so far as to suggest that commercial advertising should be entirely replaced in war time by Government announcements. Anyone who is at all conversant with the function of the trade and technical Press will quickly see that this criticism is very largely ill-informed and misdirected. Nevertheless, there is a danger that it may be taken at its face value by the hasty or unthinking, and the publication by the Advertising Association of a pamphlet entitled *Advertising in War Time* is therefore particularly timely. This pamphlet gives a reasoned and balanced account of the purpose of war-time advertising; it shows quite clearly that, so far from representing a wanton expenditure of money and a careless waste of paper, commercial advertising performs a function of the highest importance in maintaining the morale of workers and the goodwill of British trade.

Advertising to-day in the trade and technical Press comes very largely into the category of goodwill advertising, and goodwill is the feature of our trade which we can least afford to neglect nowadays. Into this category can be placed the advertising that is being done by firms at present entirely absorbed in the war effort, such as the I.C.I., the steel corporations, the motor and aircraft companies, and the like. As the brochure mentioned above points out, there is a tendency in some quarters to decry any expenditure of thought or money on safeguarding the post-war position, yet even in the midst of war it is impossible to ignore the problems of reconstruction completely. The Government itself has set up departments and ministries to consider them. Sooner or later the great commercial interests will be required to revert to normal production, and if their goodwill has in the meantime disappeared, their task will be superhuman, or at the very least they will face their task with a heavy handicap, which their friendly but keen commercial rivals overseas will not have been burdened with.

The Government has not been blind to the needs of industry in this respect. A reasonable advertising expenditure has been allowed from the beginning of the war as a proper charge on business for taxation purposes. On February 3 the Chancellor of the Exchequer said that the allowance or disallowance of expenditure on advertising was determined by the same rules as apply to other items of expenditure. Mr. Lyttelton, now a member of the War Cabinet, referred in the House of Commons with approval to the effort of manufacturers to keep their brands in front of the public by means of advertisement, and promised all the help possible in keeping alive these trade-marks.

There is another aspect of advertising which entirely escapes the notice of the general public, but particularly concerns the trade and technical Press. This may be described as the social and educative function of advertisement. The morale of all the workers in an industry, and its relation to the public may be greatly influenced by the advertising of the leading firms in such an industry. In the chemical industry alone it is sufficient to cite the announcements of the I.C.I., in which a mass of information interesting to the public is included, and which thereby establish a more understanding relation between the public and the industry. To appreciate the effect of such advertising it is necessary only to consider the conditions in the chemical industry and the spirit prevailing among its workpeople alongside those of the comparable coal industry; or, to take another example, to compare the state of the publicity-minded rayon industry with that of its great competitor, the cotton industry.

In spite of all this, there is, of course, no intention to claim that advertising deserves priority of any sort; far from it. Both advertisers and Press are fully aware of this, and at the very start of the war, throughout the Press, a voluntary reduction was made in the volume of advertising. And that is not all. Individual newspapers have hitherto been free to make what use they chose of their firmly-controlled allowance of paper, but now a departure from that principle has been made in respect of the limitation of advertising. As from this month every newspaper and periodical in the country is required to restrict advertisements to a fixed proportion of its total contents.

For those who still cavil at advertising, it may be interesting to study a few figures. Taking the period July-October, there was a big decline in expenditure in the national and provincial Press, and in magazines and technical publications of all types; the figure for 1941 stands at 50.8, taking the 1938 total as 100, while the decline in *volume* shows a drop from 100 in 1938 to 34.7 in 1941. Remembering that it is thanks to the revenue derived from advertising that the Press of this country has been able to maintain its independence, it will be difficult to maintain that the money or paper spent on advertising comes into the category of "waste." There are many more obvious targets that we could name.

On Other Pages

NOTES AND COMMENTS

Salvage from the Factory

NOW that salvage plays so important a part in our war effort, it is specially interesting to learn of the methods of salvage that are adopted at the Ford factory at Dagenham, Essex. Every week over 10,000 gallons of lubricating oil are used at these works. This is very largely reclaimed, and "cleaned" for use again. The gases from the coke ovens are all utilised, and every kind of usual by-product is collected and kept, even the heat that is dissipated when the glowing coke is cooled being made use of. The cooling is carried out by means of gases, which are heated as they pass over the coke; they are then passed through boilers, producing steam at useful pressure and economic cost without consumption of any other fuel. Worn tools are cut down to smaller sizes, and ultimately remelted.

The Sintering House

A PART of special interest is played, in the Ford salvage scheme, by the sintering house. Its particular function is to reclaim materials which would otherwise go to waste, such as metal borings and filings from the machine shops and the fettling shops, iron-ore dust and blast-furnace sludge. In their original form these materials are too fine to be used in the blast furnace because the fierce draught of air would immediately blow them out again. In the sintering house they are agglomerated into a heavy sinter or clinker, which can be utilised effectively in the blast furnace. The very fine ore dust contained in the blast-furnace gases can be reclaimed in this way. The furnace is water-cooled and the cooling water is also used to cleanse the blast-furnace gases. After use this water contains a high percentage of solid matter. It is therefore drawn off into a large circular tank with a conical bottom. The solids are allowed to settle in the bottom of the tank, while large slowly rotating blades scrape the solid matter from the bottom into a pipe, whence it is pumped to a filter where the water is taken out by suction and then used as a sludge to the sintering plant. Every day three tons of solids are reclaimed by this means.

Industrial Dust

WHEN writing on the question of Safety in the Works, we have taken every opportunity of insisting on the vital importance of protection against industrial dust and its dangers. Fortunately, we have not been alone in regarding this question as a matter deserving the attention of all engaged in the chemical industry; the problem of dealing with these dusts has been studied by experimental and practical scientists of all kinds, with the result that a considerable amount of knowledge on the subject has accumulated, while many methods have been recommended either to obviate the creation of such dust or to neutralise its dangers when its presence is inevitable. Crushing, grinding, abrading, spraying—these are only a few of the operations common to the chemical industry which give rise to dust, and even when these notoriously dust-producing processes are not involved there are still two important facts to bear in mind: (i) that any movement of any product which is in dust or powder form, or partially so, may create a dispersal of dust, and (ii) that many chemical products are toxic and may give off a small amount of dust which, though not dangerous in quantity, can ultimately be lethal from its inherent qualities.

Physics in the Dust War

IN view of the above facts, it is not surprising that a variety of instruments have been devised for measuring and precipitating industrial dusts, and for counting the number of particles per unit volume of air which may be inhaled by factory workers, as well as for preventing the deleterious particles from reaching the lungs, eyes, or digestive tracts of workers whose employment brings them into contact with these insidious enemies. Reference to past files of THE CHEMICAL AGE shows that we have often dealt with the various aspects of the problem, and the matter is this month treated, from the physicist's viewpoint, by Mr. K. L. Goodall, M.Sc., F.Inst.P., H.M. Engineering Inspector of Factories, in an article published in the *Journal of Scientific Instruments*. Mr. Goodall provides an extremely useful summary of the instrument available for measurement and control of dust conditions, including the physico-chemical devices for reckoning the mass of dust per unit volume in air-borne clouds. Ventilation systems and dust-collecting and filtering apparatus are likewise listed, and a special section deals with the risks of fire and explosion from industrial dusts.

Another Sort of Dust

WHILE we were actually writing the preceding paragraph, there was handed to us the "Winter/Spring" number of *Smokeless Air*, the smoke-abatement journal. This seemed particularly apposite, when a discussion of dust was in the air, so to speak; and indeed the smoke-abatement question impinges on the industrial dust problem in a peculiar and unexpected way. The difficulty of measuring industrial dust concentrations is enormously increased in smoke-polluted atmospheres, because the ordinary (save the mark!) pollution particles have to be removed by heat treatment from the sample of factory air to be tested, before a fair estimate of the dust particles can be made! Mr. Goodall has obviously been having trouble with his dust-slides, for he makes a heartfelt appeal for further research into a method for removing the atmospheric pollution particles from slides without either getting rid of the dust particles as well or ruining the slide altogether. This would seem to be another job for the smoke-abatement people to tackle in their businesslike way.

An Internment Paradox

A SITUATION which would be amusing if it were not serious and is, to say the least of it, paradoxical, has been brought about by the arrest of Dr. Fritz Hansgirg in California by the Federal Bureau of Investigation. Dr. Hansgirg, as is well known, is the inventor and moving spirit of the process of producing magnesium metal from magnesite which bears his name and has been in operation since last year at the Palo Alto plant of the Permanente Corporation (*see* THE CHEMICAL AGE, 1941, *45*, p. 158). Assuming that the arrest of Dr. Hansgirg was merely a routine affair, carried out in accordance with the nationwide check on enemy aliens, the directors of the Permanente concern pressed vigorously for his speedy release. However, on investigation it was discovered that the eminent scientist's wife had been corresponding with her son by a former marriage who was in the German army. Further inquisition revealed that this correspondence was of a harmless nature, and the release of Dr. Hansgirg has accordingly been recommended. Meanwhile he has been directing the work at Permanente from his place of internment by the aid of daily interviews with his secretary and with the Corporation's plant engineers.

A Word for the Army

AT one time or another, every business man has been confronted with the argument that those who control industry are incompetent or lazy, or both, and that their job would be much better done by "experts," whose precise qualifications are seldom defined. In recent months the British Army has suffered from the same kind of criticism. The set-backs which are inseparable from the fortunes of war have afforded the excuse for charges of incompetence against senior officers as a class, who are not in a position to reply and are under the necessity of fighting our battles instead of talking about them. "It was, therefore, gratifying," writes a director of Benn Brothers, Ltd., who is now in khaki, "to read Mr. Duff Cooper's vigorous defence of our Army's conduct at Singapore in his first speech since his return from Malaya. Those of us who have seen the much-abused Brass Hats at work will welcome this good word for the Army from a member of the British Government who has been with these officers in the front line. Let us hope it will silence some of the critics and will encourage us all to take new heart."

THE CHEMISTRY OF DUPLICATION*

Complex Character of Simple Processes

DUPLICATION, in the generally accepted meaning of the word, signifies production of a relatively short run of copies on machines that can be handled by an office girl after a few hours' instruction.

The commercially successful duplication processes may be divided into three main groups:

I. *Hectograph Processes.* These write or type with ink containing a soluble dye; contact the writing with a gelatinous mass into which the dye diffuses; and contact the mass with successive copy sheets, into which the dye is adsorbed from the mass. This process is the most economical where less than 100 copies are required, and is characterised by adaptability to different business systems and machines.

II. *Solvent Processes.* Here the operator types or writes on paper against special aniline dye carbon paper, so that a copy carrying a mirror-reverse dye imprint is formed; places this mirror-reverse dye imprint on a revolvable metal drum; and contacts this imprint with successive copy sheets, pre-moistened with an alcoholic solvent. The solvent dissolves a part of the dye, thus causing transfer of some dye from the master imprint to each successive copy sheet. This process is the most economical where about 100 to 400 copies are required and is notable for convenience in operation, corrections, and alterations.

III. *Stencil Processes* type or write on a stencil, so that the stencil is perforated at points of writing; place the perforated stencil over an ink supply, so that ink penetrates perforations in the stencil; and contact the stencil with successive copy sheets, so that ink penetrates the stencil in written parts, and thus prints on copy sheets. This process is the most economical where more than 500 copies are needed and is adapted to straight-run duplication rather than to business systems.

The Hectograph Process

The hectograph process is the most complex of the duplication processes chemically, as the hectograph gel is fundamentally a dye solvent (not adsorbed) gel. The gelatin gels employed are plasticised with glycerin, carbohydrates, and more recently also with glycol solvents, sulphonamides, sodium lactate, sorbitol, glyceryl and glycol phthalates, etc. The proteins have been predominatingly though not entirely of animal origin.

The necessary resistance to atmospheric conditions is imparted to the gels by tanning agents, which by more or less gradual action increase the resistance of the gel. The desirability of tanning a gel to the correct hardness, and arresting action at that point is a challenging problem, which is common to duplication and to the photographic industry. Attempts have been made to solve it by *p*H adjustments, choice of tanning agents, addition of tanning retardants, removal of excess tanning agents, and photochemical tanning. The most effective methods, however, have not yet been published and the pertinent patents may not appear for another year.

The intensity of the copies from the hectograph gel is governed by numerous factors. Significant are the solvent power of the plasticiser for the dye employed, and the ratio of solid to liquid in the gel composition as well as the gel strength of the protein constituent, and the hectograph industry is able to produce gels in which any given dye will diffuse at any desired rate of speed within very wide limits, without changing appreciably any other properties of the gel. One of the expedients used for this purpose is to emulsify in the hectograph mass, before gelation, a material non-soluble in the plasticiser. The ultra-microscopic globules of this material will impede diffusion of the dye by surface effects or by simply interposing non-dye solvent particles in the path of diffusion of the dye. The brightness of copies and ease of handling also depend on the degree of tackiness of the composition, which must be carefully controlled, to avoid tearing of paper on the machine, damage to the surface of the hectograph mass, etc. Tack is influenced by the type of protein employed, the acidity, the composition of plasticiser, certain ions, gums, starch or the like, and modes of treating the mass while in a melted state. Tanning gents or soaps reduce tack, and thereby increase the number of copies obtainable. The mass may also contain antiseptics, pigments, etc. Several types of surface lubricant have been used to prevent sticking together of hectograph films or blankets in the process of handling in the plant, when newly manufactured.

The surface cohesion of the mass is another very important characteristic. If this cohesion falls below a certain critical minimum under the influence of heat and humidity, then the adhesion to certain coated types of copy sheets may exceed the cohesion of the mass, so that particles of the mass come loose from the surface, which is thus destroyed. Cohesion is generally impaired by anything that increases the brittleness of the mass—excessive tanning is the most common influence in this class.

The "Bond" Problem

Another chemical problem in hectograph duplication is to secure a firm adhesion or "bond" to the cloth or paper, which serves as the backing for the hectograph gel. Means employed for this purpose include applying to the backing materials coatings of oils which on oxidation give off tanning decomposition products, adsorbent montmorillonite type clays, tanning agents, carried by nitrocellulose type lacquers, mutual solvents or plasticisers and various non-tanning ingredients.

Obviously all tanning agents which can be imbedded in or adhere to a lacquer coating, will bind the protein material. However, a great number of substances which are not tanning agents have the same properties. To have tanning properties, a substance must comprise at least two groups capable of reacting with different protein molecules, so as to tie these together. For bonding purposes, it is sufficient that the substance have one group capable of becoming attached to the protein molecules, provided that the rest of the molecule is adapted to becoming anchored to an adjacent coating of a different material. Bonding is greatly affected by conditions of application and by any preceding treatment of the protein gels or of the bonding agent itself, as well as of a great multiplicity of other physical variables. While protein masses have been the most successful practically, numerous attempts have been made to utilise other types of gelling ingredients, such as agar-agar, synthetic resins, and cellulose derivatives.

When copies have been taken from the hectograph mass, it is important that the dye disappear over a reasonable period of time so that the surface can be reused. This "clearing" occurs (a) by absorption of the dye in that part of the backing which will contact it when the hectograph blanket is rolled up; and (b) by diffusion of the dye into the interior of the mass and retention of the dye at that side of the backing which is covered by the mass. The rate of clearing is profoundly affected by the composition of the hectograph mass. Any change in composition which reduces the speed of diffusion will increase copy strength, but reduce speed of clearing.

The Solvent Process

Here the chemical aspects are considerably less involved, although by no means so simple as they may appear. The solvent liquids contain a highly volatile ingredient in major proportions, and a much less volatile ingredient adapted to soften the master impression so as to increase the amount of dye transferred on each contact; possibly also agents to prevent corrosion of metal parts, denaturants,

* From an article by Johan Bjorksten, Chemical Director, Quaker Chemical Products Corp., in *Chem. Ind.*, 1942, *50*, p.68.

agents to reduce inflammability, and the like. The conventional duplication solvents are based on methanol, which has the advantage of high volatility and a rather mild odour, but the great disadvantage of toxicity. More recently developed liquids are based on the non-toxic ethanol in combination with small amounts of other solvents which, by forming balanced constant boiling mixtures, impart sufficient volatility to the composition. Fluorinated hydrocarbons have been used to reduce inflammability.

In the dye-carrying carbon papers used for making master impressions for the solvent process, it is naturally not necessary that the dyes employed be water-soluble. On the contrary, water-insoluble dyes generally have a superior fade resistance. Dyes soluble only in acid media have been used in conjunction with acidic liquids.

The number of copies and their brightness is limited by the amount of dye deposited and can be increased beyond a certain limit only by improvement in the carbons and ribbons. The intensity is governed by the character of the dye selected, the hardness and composition of the wax material vehicle, mode of incorporation of the dye in the vehicle and the extent of sub-division or comminution of the dye, as well as on pre-treatment of the base cloth material.

Much progress has been made in recent years in the problem of fade resistance. The dyes which have the highest tinctorial strength are unfortunately rather susceptible to fading when exposed to direct sunlight. However, they can be protected by incorporating light filtering substances in the duplication supplies, and by including mordanting agents in the copy paper or in the solvent. Thus, the dye is transformed in the paper to an insoluble form which is substantially non-fading.

The character of the copies is largely influenced by the paper surface. Different types of finish are required for use with solvent duplication and with hectograph. In the former case, special ingredients may be employed to precipitate the dye and prevent blurring or penetration in the paper. In the case of hectograph duplication, a highly porous paper will produce bright copies and a limited run, while lower porosity of the paper results in a longer run of less brilliant copies. Surface treatment of the papers with wetting agents and special solvents have been recommended in certain instances.

The papers used for making the master impressions present a problem no less complex. In the case of the hectograph process, it is important that these present surfaces impermeable to oily ribbon inks. With solvent duplication, close control is necessary of the adhesion properties between the paper and the wax vehicle, as otherwise the dye impressions from the carbon paper would be insufficient in volume or too broad. In master paper, the hygroscopic characteristics are significant, as this type of paper is widely used for printing with hectograph printing inks, and therefore must not curl or present other difficulties in handling on printing presses at high speed.

The Stencil Process

The stencil process is chemically far less complex. The stencil inks are mainly solutions of dark dyes in glycerin type solvents, or in oil type media. Since the tinctorial strength of the dye in each impression needs to suffice only for one copy, no need exists for the use of high intensity dyes and the formulation is correspondingly simplified. The principal requirements are for the ink to penetrade the stencil without build-up and for it not to spread or "feather" excessively. Naturally, the vehicle of the ink must not affect the coating of the stencil. This coating is either a cellulose ester, ether, or a paraffin type coating, although other materials such as proteins, shellac, certain resins, waxes, bentonitic clays, metallic films, nylon type products, agar-agar, nitro starch, or generally organic polymers of elastic character and amorphous structure may be employed. The stencil coating may occlude a lubricating oil in a finely divided state.

The stencil processes and the hectograph processes can be advantageously combined by employing a special hectograph stencil ink on a stencil machine. Each copy produced in such a manner is a hectograph master, and can be used in turn to make a large number of hectograph copies. Methods of copying matter written or printed with ordinary record inks, have long been considered. Photographic methods combined with stencil, or hectograph, duplication appear to provide the most economical solutions of this problem.

Gas Research Report

Methane and Producer-Gas Investigations

THE recently published second annual report of the Council of the Gas Research Board, though restricted in scope (as is to be expected), contains some interesting material regarding the work of the various Research Committees with which the Board is concerned. Owing to wartime requirements of official secrecy a detailed report of the work of the Joint Research Committee cannot be separately published, but, in the brief account that is contained in the general report, it is noted that the main subject of investigation continues to be the production of town gas by the partial or complete gasification of coal in hydrogen under pressure. The transference of a reaction vessel and ancillary plant from the Fuel Research Station to a more convenient site will enable the larger-scale experiments which had been planned, and then suspended at the outbreak of war, to be started at an early opportunity.

Meanwhile the Joint Committee on Complete Gasification under Pressure is continuing the examination of the catalytic synthesis of methane, and, in view of the fact that the large-scale investigation of hydrogenation and gasification is now in the hands of the special Hydrogenation Sub-Committee, has decided to change its name to the Joint Committee on Methane Synthesis. Considerable progress has been made in this investigation, though the results have not been entirely as expected.

The report of the Refractory Materials Joint Committee was treated in our issue of February 14 (p. 90), but other matter of interest contained in the present report includes a note on Luminescence Phenomena, embodying the results of the work of the Second Arthur Duckham Research Fellow (Dr. E. C. W. Smith) on the impact of gas flames upon certain solid substances. A possible commercial application of one aspect of his work relates to the use of infra-red radiation in industrial drying processes.

An investigation of methods for the production at gas works of reactive coke for portable gas producers for road vehicles has been carried out in close collaboration with the Fuel Research Board and the British Coal Utilisation Research Association. The results have confirmed that cokes possessing sufficient reactivity to be suitable as fuel for portable gas producers can be made from a variety of coals in commercial gas retorts. It is important to note, however, that the processes available for this purpose will require additional supplies of coal if the present supply of town gas is not to be reduced, the magnitude of such additional supplies depending upon the particular process adopted. Further, the effect on the solid fuel market of diverting carbonising plant from the production of normal gas-works coke to special producer fuel would need to be studied and adjusted in each case.

NEW TINPLATE PROCESS

The Sharon Steel Corporation, Sharon, Pa., has developed a new process for electroplating tin on steel sheets, strip and wire, designed to effect a saving of approximately 40 to 50 per cent. in pig tin. The new process consists of electroplating a "flash" coating of a metal other than tin on to ferrous stock, then electroplating tin on the coating, and finally brightening the tin by melting it. This process has proved highly satisfactory for both wet and dry packs. It is said to be non-porous and considerably more rust-resistant than the present hot dipped product.

COLLECTED NOTES ON CHEMICAL SAFETY

Hazards in Transport and Storage

by JOHN CREEVEY

ONE of the outstanding hazards in the transport of chemical products (including temporary storage during transport) is the risk of outbreak of fire due to spontaneous evolution of heat, especially in the presence of combustible packing material.

Calcium Hypochlorite: Pressure in Containers.

Closed containers packed with calcium hypochlorite for use as disinfectant may show a 10 per cent. increase in internal pressure owing to the evolution of oxygen at temperatures as low as 25° C. At 100 to 110° C. the product is liable to decompose rapidly and with explosive violence. There is danger if it is transferred to wood boxes which are contaminated, *e.g.*, where contamination was merely due to an alcoholic solution of beechwood tar soap (*Chem. Ztg.*, 1928, *52*, 729).

Bromine: Packing Material for Breakable Containers.

Bromine is best transported in lead-lined metal containers, which are fitted with a proper closing device to prevent fuming and which have adequate lead coating externally at the hole to prevent contamination when filling or emptying. Packing material must be of non-combustible nature, such as mineral wool. If glass containers have to be used, it is advisable to adopt an absorbent packing material, such as diatomaceous earth, or sawdust treated with calcium chloride, on account of fire risk if the escaping bromine makes contact with a wood floor or other combustible material. (*U.S. Bur. Expl.*, 1917).

Lead Bromate: Danger of Impure Preparations.

If lead bromate is to be handled with safety, it should be prepared from lead salts by action of hydrobromic acid and potassium bromide, or from lead carbonate by action of bromic acid. Two accidents are recorded where the product was made from lead acetate and potassium bromate (*Zentr. Gewerbehyg. Umfallverhüt.* *14*, 342; *Chem. Zentr.*, 1927, *2*, 2384), its explosive property being attributed to the formation of diacetoplumbobromate.

Nitric Acid: Straw Packing for Carboy Crates.

Straw which has come in contact with nitric acid is liable to decompose spontaneously in its nitrated condition, and may explode at a temperature approaching 170° C. This fact must not be overlooked where straw is used as packing material for crates with carboys containing nitric acid. Synthetic nitric acid of 80 per cent. concentration or more can be satisfactorily transported in aluminium drums, as the rate of attack is negligible and aluminium has physical advantages should the drum be dropped from a considerable height. Filled aluminium drums take general deformation rather than local failure under the shock of impact, on account of the ductile nature of the metal.

Ammonium Nitrate: Danger of Feeding Outbreak of Fire.

When packed in wood containers, away from explosive substances, ammonium nitrate is not considered an explosive as far as transport and storage are concerned. (*Chem. Met. Eng.*, 1921, *26*, 535), but due precautions are always desirable. Accidents where ammonium nitrate has been involved are reviewed at the reference cited. The product can become dangerous when there is outbreak of fire, which it will feed with violence, and also where the breakage of containers may lead to admixture with other chemicals.

Mixed Acids: Evolution of Hydrogen in Empty Tanks.

If excessive corrosion of steel tank wagons by mixtures of nitric and sulphuric acid is to be avoided, the amount of sulphuric acid present should not be less than 10 per cent. Danger from explosion of hydrogen-air mixtures is present where tanks have been standing idle for a few days after being emptied. No tank wagon is ever empty, in the strict sense of that word; if explosive conditions are not likely to be present there may still be an accumulation of suffocating gases. Where it is necessary to remove a manhole cover, it is advisable to cover the opening with wet sacking or canvas to prevent ignition from sparks.

Sulphuric Acid: Dilution of Residue in Tank Wagon.

Although a strong concentration of sulphuric acid can be transported in steel tank wagons without attacking the metal, it must be remembered that the acid has great affinity for moisture and that the residual amount of strong acid left after emptying will soon become weaker acid if manhole covers or discharge valves are left open to the air; this weak acid *is* corrosive to steel and evolution of hydrogen is an inevitable consequence.

Sodium Picramate: Picramic Acid.

Both picramic acid (dinitroaminophenol) and sodium picramate are used as intermediates in the manufacture of certain dyestuffs. The sodium salt is unsafe for transport unless it carries 20 per cent. moisture (*U.S. Bur. Expl.*, 1921); with 15.5 per cent. moisture the product is readily ignited by flame or spark, and at elevated temperature (above 140° C.) it is liable to explode with violence.

Fire Risk in Contact with Combustible Packing.

Phosphorus pentoxide will generate sufficient heat by the absorption of moisture to cause the ignition of adjacent combustible material; this common risk of fire in transport and storage of chemical products is also present (as is well known) in the case of caustic or unslaked lime, but between these two products there are many others which must be regarded with suspicion when the risk is not already known and confirmed. It exists (among many others) in the case of glacial acetic acid, ammonium perchlorate, barium and calcium nitrates, bromine, chromic acid, and chromates (if acid with sulphuric acid).

Charcoal Dust: Ignition when Freshly Ground.

Charcoal dust forms explosive mixtures with air, which can be ignited by flame or spark. It is a dangerous material to store in the same building as chlorates or nitrates. There is outstanding tendency to ignite spontaneously in the case of freshly ground material, especially if tightly packed in containers.

Acetic Acid: Inflammable Vapour.

Glacial acetic acid gives inflammable vapour at temperatures above 40° C.; it is liable to explode if in contact with chromic acid, fuming nitric acid, or sodium peroxide.

Chlorine Gas in Cylinders.

Over and above the precautions applying to gases in cylinders generally, chlorine gas needs special care from the danger of a leaky cylinder, as the escaping gas can easily ignite combustible matter, such as sacking, straw, wood shavings, or paper, if there is contamination with turpentine. Chlorine, moreover, forms explosive mixtures with hydrogen, methane, acetylene, and ethylene, and these mixtures are ignited by sunlight or artificial light of strong actinic value. As a precaution against presence of acetylene, chlorine cylinders should never be stored near a stock of calcium carbide; it is also wise to avoid storage near cylinders of ammonia gas, or strong liquid ammonia in carboys or bottles, owing to possible formation of the dangerously explosive nitrogen trichloride.

Spontaneous Ignition of Metallic Sulphides.

The dangerous metallic sulphides are chiefly those of potassium, sodium, barium, calcium, iron, and copper. The presence of carbon (aside from moisture) increases the danger; similarly, carbon in various divided forms and certain types of carbonaceous matter may take fire spontaneously in the presence of a metallic sulphide and moisture. In contact with acids the metallic sulphides liberate hydrogen sulphide gas, which is both poisonous and able to aid progress of a fire. Metallic sulphides must therefore be protected from contact with moisture, acids, and finely-divided carbon. Ferrous sulphide is comparatively harmless in lump form (apart from contact with acids), but in powdered form it has been known to evolve considerable heat. Copper sulphide and calcium sulphide are both liable to become red hot if stored in heaps under humid conditions.

Aluminium-Magnesium Alloys*

Resistance to Alkali Corrosion

AMONG alloys that have come into prominence during the past few years are aluminium-base alloys containing varying amounts of magnesium. These alloys not only possess the characteristics of lightness in weight inherent in both metals, but also exhibit in many cases marked resistance to the action of alkaline media. Small additions of magnesium to aluminium do not result in improved resistance to attack by sodium carbonate solutions but alloys containing 4 per cent. or more magnesium are much more resistant to attack in such solutions.

Comparisons of the resistance of the same alloys to corrosion by solutions of sodium hydroxide have recently been made. The results are substantially in agreement with those obtained with the sodium carbonate solutions, inasmuch as alloys containing less than 3 per cent. magnesium showed less resistance than did certain aluminium alloys containing no magnesium, while alloys containing more than 4 per cent. magnesium exhibited improved resistance to corrosion. It was also found that alloys of aluminium containing more than 3 per cent. magnesium were less resistant to solutions of sulphuric acid than were those containing lesser amounts of magnesium. In other words, alloys of aluminium containing more than 3 per cent. magnesium appear to exhibit, in a measure, the corrosion characteristics of magnesium itself.

In tests conducted at 31° C. the rate of attack was found to become appreciable only in concentrations of 0.1 per cent. and above of sodium hydroxide or sulphuric acid on high purity aluminium, high purity aluminium-base alloys containing magnesium, and on certain aluminium-magnesium alloys of commercial purity.

Beside the tests made with alkaline solutions of varying strengths and with sulphuric acid solutions, another test was made with certain of the alloys to determine their behaviour in solutions of sulphuric acid "inhibited" with sodium bichromate. Since sulphuric acid solutions are commonly used for dissolving flux residues from welded aluminium articles, some contamination by chlorides (from the flux residues) is naturally encountered. Consequently, this test also included sulphuric acid solutions containing a definite amount of chlorides (as sodium chloride) with and without an addition of sodium bichromate. The results showed that (1) with increasing magnesium content a decrease in corrosion resistance resulted, which was in agreement with the results previously discussed; (2) the addition of chlorides as sodium chloride had no appreciable effect upon the corrosiveness of the sulphuric acid solution, as measured by weight changes; and (3) the addition of sodium bichromate served as an accelerator of attack rather than an inhibitor. When it was added to the sulphuric acid solution, the attack was tripled; while with the sulphuric acid and sodium chloride solution the attack was between 25 and 30 times as great.

The attack on the aluminium in the sulphuric acid, the sulphur acid and sodium bichromate, and the sulphuric acid plus sodium chloride solutions was of a uniform etching type. In the sulphuric acid-sodium chloride-sodium bichromate solution the attack was largely of a severe, non-uniformly distributed pitting type. Similar severe pitting sometimes results when insufficient additions of inhibitor are made to chloride solutions to which iron, steel, zinc, and aluminium specimens are exposed.

The probable reason why the alloys of higher magnesium content are less attacked in alkaline solutions is because of the protective nature of the film which is formed. It has also been noted that aluminium alloys containing substantial additions of magnesium are more resistant to the action of alkaline soap solutions or solutions of ammonium hydroxide than are aluminium alloys of lower magnesium content. This superiority of the aluminium-magnesium alloys is exhibited in both hot and cold solutions.

It is interesting to note that the alloys of higher magnesium content were definitely not single phase materials, although they were much more resistant to attack. Evidently, if corrosion in alkaline solutions is electrochemical in nature, local cell action was not stimulated by the presence of constituent particles.

* From an article by L. J. Benson and R. B. Mears, Aluminium Co. of America (*Chem. Met. Eng.*, 1942, **49**, 1, 88).

Indian Chemical Progress

Further Steps towards Self-Sufficiency

NEVER before has chemical production in India made such strides as in the last two years. Not only have pre-war plans matured, but the loss of overseas sources of supply has stimulated many new enterprises. Further information has now come to hand of the latest Indian developments, supplementing the account contained in our issue of January 10 (p. 33).

Toluol is made on a substantial scale to meet the demand from the explosives industry, and the manufacture of nitric acid is also part of the scheme of explosive production. The output of soda ash and caustic soda which has been proceeding for some time in two factories in the Punjab has been augmented by a new plant which began operations early this month in connection with the Tata steel centre.

Other chemicals of industrial importance now being made on a large scale are naphthalene, glycerine, copper sulphate, aluminium sulphate, magnesium sulphate, zinc chloride, and alum. All these products have been made in order to meet an urgent demand either from the ordnance factories or from civilian industries. In some cases the Government has assured would-be manufacturers that protection of the new industries will be granted after the war, but mostly it is thought that the natural advantages of cheap labour and transport compared with imported products will be sufficient to enable local makers to withstand post-war competition.

Another prime factor in chemical development has been the establishment of new non-chemical industries which supply raw materials for chemical manufacture as by-products. The growth of the steel industries and the erection of a new steel centre in Bengal has been of considerable importance for the supply of ammonia, benzol, tar, etc. New chemical industries also owe their development to local industrialisation schemes such as that sanctioned for Hyderabad where, *inter alia*, sulphuric acid, sulphates, glucose, starch, casein, and plastics are to be made.

The principal difficulty in the development of a pharmaceutical industry in India has been the lack of skilled labour and experience, but war needs have brought about a tremendous change. Much of the work in this field has been done by Government Medical Depot Factories. A beginning has been made in the preparation of sera against tetanus, diphtheria, anthrax, epidemic jaundice, etc., while orders have been placed with local manufacturers of amyl nitrite, atropine sulphate, nikethamide, peptone, sodium tauroglycocholate, and trichloracetic acid. A substitute for cod liver oil is made from sharks' livers, and the Government has bought more than 8000 gallons of this shark oil. Other new pharmaceuticals include galenicals and quinine preparations.

Reports announce the manufacture of boric acid (from Tibetan borax), alkaloids (caffeine from tea waste), chloral hydrate, chloroform, sodium citrate, thiodiphenylamine, and vitamins C and D, but the quantities in question seem to be mostly very small. In the case of vitamin D the development does not yet seem to have gone beyond the laboratory scale, but tablets of vitamin C are reported to have been made from "amla" berries.

SYNTHETIC RUBBER IN THE U.S.

Extended Production Capacity Planned

IN a discussion of American industrial progress in the manufacture of synthetic rubber, or, more correctly, synthetic rubber-like polymers, H. I. Cramer, of Sharples Chemicals, Inc., Philadelphia, gives a summary of the United States' production capacity of these materials.* This production, he notes, has been increasing steadily since 1932, but has represented less than one per cent. of the total rubber requirements of the U.S. until recent years. Neoprene (originally duprene) was the first synthetic product to be made in commercial quantities, and it has led the field in yearly production from the beginning.

The estimated total production figures for the past three years for all types of synthetic rubber are:

1939	2500 long tons
1940	4000 ,, ,,
1941	17,000 ,, ,,

The 1941 production may be divided up as follows:

Buna types	4000 long tons
Neoprene	6500 ,, ,,
Thiokol	1500 ,, ,,
Polyvinyl chloride types (plasticised)	5000 ,, ,,
Total	17,000 ,, ,,

State-Financed Plants

Present production is entirely from privately-owned plants, and under normal conditions the building of additional plants would be undertaken by private industry as improved manufacturing methods were developed and the demand for the resulting products increased. However, to undertake the building of large plants capable of producing the normal requirements in rubber (600,000 long tons per year) or even an appreciable fraction of it would require a capitalisation greater than the individual rubber companies could finance. Accordingly, as the Far Eastern situation became more threatening in early 1940, Congress began to study the advisability of building large government-financed plants. On June 14 of that year the Senate Committee on Military Affairs considered a Bill to appraise the progress made by industry in the development of synthetic rubbers and to explore the potentialities of building plants to produce rubber. In view of the action finally taken in May, 1941, by the Government, it is of interest that, in this hearing, plants were considered which would produce 100 and 300 tons per day. On an annual basis such plants would make approximately 35,000 and 100,000 tons, respectively. It was estimated that the smaller plants would cost about $10,000,000, and the larger $25,000,000 to $50,000,000, according to the type of rubber produced. On the basis of these figures, plants large enough to supply the normal requirements of rubber would require a capitalisation of $150,000,000 to $300,000,000. Later, however, E. R. Bridgewater estimated that the total cost of plants to produce the butadiene, styrene, and accessory materials going into the polymerisation process, for the production of 30,000 tons per month (*i.e.,* approximately 60 per cent. of the normal U.S. consumption of natural rubber) would be in the neighbourhood of $500,000,000. Any plans which may have been under consideration to build such large plants were discarded in favour of smaller units. This was fortunate, perhaps, because the erection of such plants would have tended to freeze the entire development of synthetic rubbers at the pilot-plant stage.

In May, 1941, Jesse Jones announced the Government's decision to build four government-owned synthetic rubber plants, each with an initial production capacity of 10,000 tons per year. In January, 1942, he announced a further expansion of the synthetic rubber programme, costing $400,000,000, which will provide for the manufacture of 400,000 tons per year in addition to the production of plants already in operation or under construction. At the same time it was disclosed that the national stock-pile of natural rubber was 600,000 tons. The plants will be operated under a lease agreement by the four major rubber companies, the B. F. Goodrich Company, the Goodyear Tire and Rubber Company, the Firestone Tire and Rubber Company, and the United States Rubber Company.

The plants for producing the other types are also being expanded rapidly. Du Pont is increasing the capacity of its Deepwater plant from 6000 to 9000 long tons per year, and is building a new plant at Louisville, the capacity of which will be 10,000 long tons. These plants are expected to be in production early this year. Thiokol Corporation announced in May the completion of a new unit at the Dow Chemical Company's plant at Midland, bringing their total capacity up to 1750 long tons per year. Plans were disclosed at the same time for another unit to increase the present capacity by 50 per cent. The B. F. Goodrich Company has expanded its Koroseal plant at Niagara Falls; when its new plant at Louisville is completed, its current production of Koroseal will be quadrupled. Although no production data have been given out on this product, it has been reported that the total production of polyvinyl chloride polymers (*i.e.,* including the Vinylites as well as Koroseal) runs at present to about 3575 long tons per year, and that after the second quarter of 1942 it will be increased to 11,000 long tons. These figures are for the unplasticised material. The percentage of plasticiser normally added is between 30 and 40 per cent.

Future Production Figures

The above data for present and projected production of synthetic rubber are summarised as follows (in long tons):

	July, 1941	Jan., 1942	Jan., 1943
Buna types	5000	10,750	70,000
Neoprene	6500	9000	19,000
Thiokol	1750	1750	2,650
Polyvinyl chloride (40% plasticiser)	5000	6000	18,000
	18,250	27,500	109,650
Percentage of normal requirements	3	4.6	18.2

Obviously, a production capacity of 18 per cent. of its normal requirements would leave the country in a serious condition if the supply of crude rubber from the Far East was cut off for any extended period. In such an event the building of the larger plants already discussed would undoubtedly be undertaken. However, authorities in the rubber industry estimate that a minimum of three years would be required to build these "superplants." To bridge the gap until they could be completed, the Reconstruction Finance Corporation has allotted the funds required to accumulate a reserve stock-pile of 515,000 long tons of crude rubber, or a 10-month supply. At present the accumulation in this government reserve is about 225,000 tons. Total stock, including this reserve, the stocks in company warehouses, and those afloat, is equivalent to nine months' supply.

* *Ind. Eng. Chem.* 1942, **34**, 2, 249.

IRON RECOVERY WITHOUT SMELTING

A method of recovering iron from its ores without smelting is claimed in U.S.P. 2,265,812, granted to Theodore Nagel of Brooklyn, N.Y. In this method the ore, in the form of hæmatite or iron oxide, is first crushed, then caused to flow by gravity in a zig-zag path down a large tower. As the ore tumbles downward, hot carbon monoxide and hydrogen gases from burning crude oil are percolated through the ore from the bottom of the tower. In this way, it is claimed, by the time the ore gets to the bottom, all the oxides are removed and the ore, without being smelted, has been converted into the metal state.

Personal Notes

MR. A. J. THOMPSON has been elected chairman of R. W. Greeff and Co., Ltd., and Greeff Chemicals Holdings, Ltd.

MR. A. M. BAER has been appointed a Joint Controller of Non-Ferrous Metals, in place of MR. J. C. BUDD, kho has resigned on grounds of health.

MR. T. C. MOORSHEAD, of United Glass Bottle Manufacturers, Ltd., has been elected to the board of the American Chamber of Commerce in London.

PROFESSOR G. E. PEARSE has succeeded MR. KENNETH RICHARDSON as president of the Associated Scientific and Technical Societies of South Africa.

SIR SAMUEL BEALE, K.B.E., chairman of Guest, Keen and Nettlefolds, Ltd., has been appointed chairman of the business members of the Industrial and Export Council, in succession to the late Sir Francis D'Arcy Cooper.

MR. C. A. F. HASTILOW, M.Sc., F.I.C., is shortly joining the Miscellaneous Chemicals Control, and will be in charge of the new section which has been set up to deal with the increasing number of paint-industry raw materials for which the Control is responsible.

MR. R. BUTLER, President of the Board of Education, on the invitation of the Lord President of the Council (Sir John Anderson), has agreed to be chairman of the Scientific Advisory and Engineering Advisory Committees, in succession to Lord Hankey.

MR. K. H. GREGORY will be in charge of the regional office of the Priorities Branch of the Dominion Department of Munitions and Supply which is to be opened at Vancouver, B.C. He will assist manufacturers on the west coast of Canada in obtaining priority ratings.

Obituary

DR. GEORGE SENTER, D.Sc., Ph.D., F.I.C., who died at Pinner, Middlesex, on March 14, aged 68, was Principal of Birkbeck College in 1918-39, having been head of the chemistry department in the College since 1914. He was intimately connected for many years with the educational side of chemistry and had been examiner in chemistry to the Royal Colleges of Physicians and Surgeons and to the University of Birmingham. His Fellowship of the Institute of Chemistry dated from 1915.

PROFESSOR A. W. NASH, M.Sc., M.I.Mech.E., M.I.Chem.E., F.C.S., Professor of Oil Engineering and Refining at the University of Birmingham, died at Solihull on March 14, aged 55. It was in 1922, when the Council of the University decided to create a separate chair of Oil Engineering and Refining, that Nash joined the staff of the department, under Professor R. R. Thompson, whom he succeeded two years later. Before going to Birmingham he had spent many years in the Middle East in the exploration of oil and in the construction of refineries. He wrote with distinction on petroleum technology.

With the death of SIR WILLIAM HENRY BRAGG, O.M., science both national and international loses one of its most inspired and revered leaders. Sir William died in London on March 12 in his 80th year. Unlike many great research workers, Bragg had the gift of popular exposition and his Christmas lectures to children at the Royal Institution were famous. Industry will always be grateful to him for his unfailing support of scientific research and its application to industrial problems, while among pure scientists he will be specially remembered for his great contributions in the field of X-ray analysis.

A native of Wigton, Cumberland, Bragg was educated at King William's College, Isle of Man, and Trinity College, Cambridge. His first professional appointment was to the Chair of Physics and Mathematics at Adelaide University; he remained in Adelaide for 22 years, having married there in 1889. His experiments on radioactivity began in 1906 and continued after his return to England in 1909 as Cavendish Professor at Leeds University, and his work (with that of his son, W. L. Bragg) was crowned in 1915 with the award of the Nobel Prize for Physics. In 1914-18 he was concerned with the anti-submarine campaign and in 1920 he was created K.B.E. He had been appointed Quain Professor at University College, London, in 1915, and he was now able to take up his work there and continue his researches in crystal analysis. Scientific honours showered upon him and his duties multiplied. In 1923 he was appointed Director of the Royal Institution, Fullerian Professor, and Director of the Davy-Faraday Laboratory; in 1935 he was elected President of the Royal Society, a position that he held for five years; and in 1937 he joined the Industrial Research Advisory Council. In October, 1940, with five members of the Royal Society he was appointed to the war-time Scientific Advisory Committee, under Lord Hankey's chairmanship.

New Control Orders

China Clay

THE Board of Trade has issued the Production and Supply of China Clay (Restriction) Order, 1942 (S.R. and O. 1942, No. 410) which comes into operation on April 1. By this Order no person, except under licence, shall win any china clay from any mine or quarry, or supply any china clay to any other person.

Congo Copal

The Control of Paint, Lacquer, and Varnish Orders (1941 and 1942) have been varied by a Direction (S.R. and O. 1942, No. 414) issued by the Ministry of Supply, which came into force on March 9. By this Direction, Congo copal paints, varnishes, and lacquers are excluded from the list of controlled materials mentioned in the above Orders, provided that no other of the oils or resins mentioned in the definition of "controlled material" in the Orders is included in the said copal paints, etc.

Molasses Prices

The Minister of Supply has made the Control of Molasses and Industrial Alcohol (No. 15) Order, 1942, coming into operation on March 30, by which maximum prices of molasses are fixed on a delivered basis. Further, in the case of material sold in containers and not in bulk, maximum prices are fixed on a basis of gross weight. The amounts included for carriage in the present prices have been based on the average cost of delivery, etc. Provision is made for reduction in price where sellers take delivery at a control depot or at a sugar factory.

Ferro-Alloy Prices

Revised prices for ferro-alloys and allied materials, and consequent increases in prices for high-speed steel are contained in the Control of Iron and Steel (No. 20) Order, which came into force on March 16.

The new prices are as follows:—ferro-molybdenum and molyte, 6s. per lb. of molybdenum content; calcium molybdate, 5s. 9d. per lb. of molybdenum content; ferro-tungsten, 9s. 8d. per lb. of tungsten content; 98-99 per cent. tungsten powder, 9s. 9½d. per lb.; ferro-vanadium, 15s. 6d. per lb. of vanadium content.

For high-speed steel the prices are increased to 3s. 8d. per lb. for 14 per cent. tungsten, 4s. 8d. per lb. for 18 per cent. tungsten and 5s. 4d. per lb. for 22 per cent. tungsten.

Latex Prices

The Control of Rubber (No. 9) and (No. 10) Orders, 1942 (S.R. and O. 1942, Nos. 440, 449), and Direction No. 1 to the Control of Rubber (No. 2) Order (S.R. and O. 1942, No. 441), all of which came into force on March 16, vary the provisions of previous rubber control orders in respect of the articles in the manufacture of which rubber may be used. The No. 10 Order, in addition, places the following maximum prices on liquid latex: at concentrations of less than 45 per cent., 7s. per gallon; at concentrations of 45 per cent. and upwards (excluding the following categories), 10s. 3d. per gal.; T. Revertex, 10s. 6d. per gal.; Revultex, 10s. 11d. per gal.; and Standard Revertex, 12s. per gallon. Extra charges are allowable when the liquid latex is sold in amounts of less than 44 gallons.

Weekly Prices of British Chemical Products

CONDITIONS on the general chemicals market during the past week have been fairly active, with most sections displaying a strong undertone. Delivery specifications to the chief consuming industries have covered good quantities and supplies are being maintained on steady lines. Fresh buying has been in evidence in both the potash and soda sections, the demand being greater than the available supplies. A good demand for the barium compounds is maintained in spite of the recent price advances. Barium chloride is in steady request at £14 10s. to £16 per ton ex works. Other active items include formaldehyde, white arsenic, and the lead oxides. The position in the coal tar products market still remains steady, and price movements, if any, have been few or of small amount. Both crude and crystal carbolic acid and cresylic acid are moving steadily against contracts and a fairly active demand is reported for creosote oil.

MANCHESTER.—It was reported on the Manchester market during the past week that a fairly wide range of chemical products for use in the cotton and woollen textile and allied industries is being taken up, mainly against contracts, and a fair demand is also reported from most of the other leading industrial outlets. On the whole, new inquiries have been on a reasonably satisfactory scale, with a strong price undertone apparent in virtually all sections. With regard to the by-products, the xylols appear to be barely steady at the moment. Trade in pitch and the pyridines is no more than moderate, but in most other sections the demand is steady.

GLASGOW.—In the Scottish heavy chemical trade business has been rather quiet both for home trade and export. Prices generally continue very firm, several materials being slightly dearer on account of the increased costs of raw materials.

Price Changes

Rises: Ammonium sulphate, barium chloride, bleaching powder, carbon bisulphide, copper sulphate, cresylic acid, lead acetate, lead red, sodium phosphate, sodium silicate, sodium sulphite.

Falls: Arsenic sulphide, cadmium sulphide, chrometan, naphtha, potassium carbonate, pyridine, soda caustic, xylol.

General Chemicals

Acetic Acid.—Maximum prices per ton: 80% technical, 1 ton £39 10s.; 10 cwt./1 ton, £40 10s., 4/10 cwt., £41 10s.; 80% pure, 1 ton, £41 10s.; 10 cwt./1 ton, £42 10s.; 4/10 cwt., £43 10s.; commercial glacial, 1 ton, £49; 10 cwt./1 ton, £50; 4/10 cwt., £51; delivered buyers' premises in returnable barrels, £4 10s. per ton extra if packed and delivered in glass.

Acetone.—Maximum prices per ton, 50 tons and over, £65; 10/50 tons, £65 10s.; 5/10 tons, £66; 1/5 tons, £66 10s.; single drums, £67 10s.; delivered buyers' premises in returnable drums or other containers having a capacity of not less than 45 gallons each. For delivery in non-returnable containers of 40/50 gallons, the maximum prices are £3 per ton higher. Deliveries of less than 10 gallons free from price control.

Alum.—Loose lump, £10 10s. per ton, d/d, nominal.

Aluminium Sulphate.—£10 5s. to £11 5s. per ton d/d.

Ammonia Anhydrous.—1s. 9d. to 2s. 3d. per lb.

Ammonium Carbonate.—£37 per ton d/d in 5 cwt. casks.

Ammonium Chloride.—Grey galvanising, £22 10s. per ton, in casks, ex wharf. Fine white 98%, £19 10s. per ton. See also Salammoniac.

Antimony Oxide.—£111 to £117 per ton.

Arsenic.—99/100%, £33 10s. per ton, ex store.

Barium Chloride.—98/100%, prime white crystals, £14 10s. to £16 per ton, bag packing, ex works; imported material would be dearer.

Bleaching Powder.—Spot, 35/37%, £11 to £11 10s. per ton in casks, special terms for contract.

Borax, Commercial.—Granulated, £31 10s.; crystals, £32 10s.; powdered, £33; extra fine powder, £34; B.P. crystals, £40 10s.; powdered, £41; extra fine, £42 per ton for ton lots, in free 1-cwt. bags, carriage paid in Great Britain. Borax Glass, lump, £83; powder, £84 per ton in tin-lined cases for home trade only, packages free, carriage paid.

Boric Acid.—Commercial, granulated, £52 15s.; crystals, £53 15s.; powdered, £54 15s.; extra fine powder, £56 15s.; B.P. crystals, £61 15s.; powdered, £62 15s.; extra fine powdered, £64 15s. per ton for ton lots in free 1-cwt. bags, carriage paid in Great Britain.

Calcium Bisulphite.—£6 10s. to £7 10s. per ton f.o.r. London.

Calcium Chloride.—70/72% solid, £5 15s. per ton ex store.

Charcoal Lump.—£10 10s. to £14 per ton, ex wharf. Granulated, supplies scarce.

Chlorine, Liquid.—£22 7s. 6d. per ton, d/d in 16/17 cwt. drums (3-drum lots); 5½d. per lb. d/d station in single 70-lb. cylinders.

Chrometan.—Crystals, 5 1/16d. per lb.; liquor, £24 10s. per ton **d/d station in drums.**

Chromic Acid.—1s. 3d. per lb., less 2½%, d/d U.K.

Citric Acid.—1s. 5½d. per lb., normal; imported material, 1s. 10d. per lb. MANCHESTER: 1s. 8d. per lb.

Copper Oxide.—Black, £95 per ton.

Copper Sulphate.—About £31 per ton f.o.b. MANCHESTER: £31, less 2%, in 5 cwt. casks f.o.b. Liverpool.

Cream of Tartar.—100%, £17 2s. per cwt., less 2½%, d/d in sellers' returnable casks.

Formaldehyde.—£24 5s. to £25 10s. per ton d/d. MANCHESTER: 40%, £23 10s. to £26 per ton in casks, according to quantity, d/d.

Formic Acid.—85%, £47 per ton for ton lots, carriage paid; smaller parcels quoted up to 50s. per cwt., ex store.

Glycerine.—Chemically pure, double distilled 1260 s.g., in tins, £4 to £5 per cwt., according to quantity; in drums, £3 12s. 6d. to £4 6s. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

Hexamine.—Technical grade for commercial purposes, about 1s. 4d. per lb.; free-running crystals are quoted at 2s. 1d. to 2s. 3d. per lb.; carriage paid for bulk lots.

Hydrochloric Acid.—Spot, 6s. 3½d. to 8s. 9½d. carboy d/d, according to purity, strength and locality.

Hydrofluoric Acid.—59/60%, about 1s. to 1s. 2d. per lb.

Iodine.—Resublimed B.P., 9s. 11d. to 13s. 11d. per lb., according to quantity.

Lactic Acid.—Dark tech., 50% by vol., £40 10s. per ton. Not less than one ton lots ex works; barrels returnable, carriage paid.

Lead Acetate.—White, £50 ton lots. MANCHESTER: £51 to £54 per ton.

Lead Nitrate.—About £46 10s. per ton d/d in casks.

Lead, Red.—English, 5/10 cwt., £44 10s.; 1 cwt. to 1 ton, £44 5s.; 1/2 tons, £44; 2/5 tons, £43 10s.; 5/20 tons, £43; 20/100 tons, £42 10s.; over 100 tons, £42 per ton, less 2½ per cent., carriage paid, non-setting red lead, 10s. per ton dearer in each case.

Lead, White.—Dry English, less than 5 tons, £55; 5/15 tons, £51; 15/25 tons, £50 10s.; 25/50 tons, £50; 50/200 tons, £49 10s. per ton, less 5 per cent., carriage paid; Continental material, £1 per ton cheaper. Ground in oil, English, 1/5 cwt., £66 10s.; 5/10 cwt., £65 10s.; 10 cwt. to 1 ton, £65; 1/2 tons, £63 10s.; 2/5 tons, £62 10s.; 5/10 tons, £60 10s.; 10/15 tons, £59 10s.; 15/25 tons, £59; 25/50 tons, £58 10s.; 50/100 tons, £58 per ton, less 5 per cent., carriage paid.

Litharge.—1 to 2 tons, £44 per ton.

Lithium Carbonate.—7s. 9d. per lb. net.

Magnesite.—Calcined, in bags, ex works, £18 15s. to £22 15s. per ton.

Magnesium Chloride.—Solid (ex wharf), £12 to £16 per ton. MANCHESTER: £14 to £15 per ton.

Magnesium Sulphate.—Commercial, £12 to £14 per ton, according to quality, ex works.

Mercury Products.—Controlled price for 1 cwt. quantities: Bichloride powder, 11s. 7d.; bichloride lump, 12s. 2d.; ammon. chloride powder, 13s. 5d.; ammon. chloride lump, 14s.; mercurous chloride, 13s. 9d.; mercury oxide, red **cryst., B.P., 15s.; red levig. B.P., 15s. 6d.; yellow levig.** B.P., 14s. 9d.; yellow red, 14s. 4d.; sulphide, red, 12s. 11d.

Methylated Spirit.—Industrial 66° O.P. 100 gals., 2s. 4d. per gal.; pyridinised 64° O.P. 100 gals., 2s. 5d. per gal.

Nitric Acid.—£24 to £26 per ton, ex works.

Oxalic Acid.—£60 to £65 per ton for ton lots, carriage paid, in 5-cwt. casks; smaller parcels would be dearer; deliveries slow.

Paraffin Wax.—Nominal.

Potash, Caustic.—Basic price for 50-100 ton lots. Solid, 88/92%, commercial grade, £55 7s. 6d. per ton, c.i.f. U.K. port, duty paid. Broken, £5 extra; flake, £7 10s. extra; powder, £10 extra per ton. Ex store, £3 10s. supplement. Liquid, d/d £35 per ton.

Potassium Bichromate.—Crystals and granular, 7½d. per lb.; ground, 8½d. per lb., for not less than 6 cwt.; 1-cwt. lots, ¼d. per lb. extra.
Potassium Carbonate.—Basic prices for 50 to 100 ton lots; calcined, 98/100%, £52 10s. per ton, c.i.f. U.K. port. Ex warehouse, £55 5s. per ton.
Potassium Chlorate.—Imported powder and crystals, nominal.
Potassium Iodide.—B.P., 8s. 8d. to 12s. per lb., according to quantity.
Potassium Nitrate.—Small granular crystals, £40 to £45 per ton ex store, according to quantity.
Potassium Permanganate.—B.P., 1s. 10d. per lb. for 1 cwt. lots; for 3 cwt. and upwards, 1s. 9½d. per lb.; technical, £7 18s. 6d. to £8 10s. 6d. per cwt., according to quantity d/d.
Potassium Prussiate.—Supplies scarce, prices nominal.
Salammoniac.—First lump, spot, £48 per ton; dog-tooth crystals, £50 per ton; medium, £48 10s. per ton; fine white crystals, £19 10s. per ton, in casks, ex store.
Soda, Caustic.—Solid 76/77%; spot, £15 7s. 6d. per ton d/d station.
Sodium Acetate.—£40 per ton, ex wharf.
Sodium Bicarbonate (refined).—Spot, £11 per ton, in bags
Sodium Bichromate.—Crystals, cake and powder, 5⅝d. per lb., anhydrous, 6d. per lb., net d/d U.K.
Sodium Bisulphite Powder.—60/62%, £17 10s. per ton d/d in 2-ton lots for home trade.
Sodium Carbonate Monohydrate.—£21 per ton d/d in minimum ton lots in 2 cwt. free bags.
Sodium Chlorate.—£36 to £45 per ton, d/d, according to quantity.
Sodium Hyposulphite.—Pea crystals, £20 per ton for 2-ton lots; commercial £14 15s. per ton; photographic, £25 5s. per ton.
Sodium Iodide.—B.P., for not less than 28 lb., 9s. 6d. per lb.; for not less than 7 lb., 13s. 1d. per lb.
Sodium Metasilicate.—£16 per ton, d/d U.K. in 1-ton lots.
Sodium Nitrate.—Refined, £15 5s. per ton for 6-ton lots d/d.
Sodium Nitrite.—£21 to £23 per ton for ton lots.
Sodium Percarbonate.—21½% available oyxgen, £7 per cwt.
Sodium Phosphate.—Di-sodium, £23 to £28 per ton d/d for ton lots. Tri-sodium, £25 to £30 per ton d/d for ton lots.
Sodium Prussiate.—7¼d. to 8½d. per lb. ex store.
Sodium Silicate.—£9 10s. to £10 12s. 6d. per ton, for 4-ton lots.
Sodium Sulphate (Glauber Salts).—£4 10s. ton d/d.
Sodium Sulphate (Salt Cake).—Unground. Spot £4 8s. 6d. per ton d/d station in bulk. MANCHESTER: £4 13s. 6d. per ton d/d station.
Sodium Sulphide.—Solid 60/62%. Spot, £17 15s. per ton d/d in drums; crystals, 30/32%, £12 7s. 6d. per ton d/d in casks.
Sodium Sulphite.—Anhydrous, £29 10s. per ton; Pea crystals, spot, £20 10s. per ton d/d station in kegs; commercial, £12 to £14 per ton d/d station in bags.
Sulphur.—Finely powdered, £14 10s. per ton d/d; precip. B.P., 68s. per cwt; ungraded, £16 15s. per ton.
Sulphuric Acid.—168° Tw., £6 10s. to £7 10s. per ton; 140° Tw., arsenic-free, £4 11s. per ton; 140° Tw., arsenious, £4 3s. 6d. per ton. Quotations naked at sellers' works.
Tartaric Acid.—4s. 3½d. per lb., less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: 4s. 4d. per lb.
Tin Oxide.—Snow white, 305s. per cwt.
Zinc Oxide.—Maximum prices: White seal, £30 17s. 6d. per ton; red seal, £28 7s. 6d. d/d; green seal, £29 17s. 6d. d/d.
Zinc Sulphate.—Tech., £20-£21 per ton, carriage paid, casks free.

Rubber Chemicals

Antimony Sulphide.—Golden, 1s. 2d. to 2s. 2d. per lb. Crimson, 2s. 2d. to 2s. 6d. per lb.
Arsenic Sulphide.—Yellow, 1s. 9d. per lb.
Barytes.—Best white bleached, £8 3s. 6d. per ton.
Cadmium Sulphide.—5s. 9d. to 6s. 6d. per lb.
Carbon Black.—5¼d. to 7⅝d. per lb., according to packing.
Carbon Bisulphide.—£35 5s. to £40 5s. per ton, according to quality, in free returnable drums.
Carbon Tetrachloride.—£46 to £49 per ton.
Chromium Oxide.—Green, 1s. 6d. per lb.
India-rubber Substitutes.—White, 6¼d. to 10d. per lb.; dark, 6 1/16d. to 6⅝d. per lb.
Lithopone.—30%, £25 per ton; 60%, £31 to £32 per ton. Imported material would be dearer.
Mineral Black.—£7 10s. to £10 per ton.
Mineral Rubber, "Rupron."—£20 per ton.
Sulphur Chloride.—7d. per lb.
Vegetable Lamp Black.—£48 per ton.
Vermilion.—Pale or deep, 13s. 8d. per lb. for 30 lb. lots.
Plus 5% War Charge.

Nitrogen Fertilisers

Ammonium Phosphate Fertilisers.—Type B, £13 18s. 9d. per ton in 6-ton lots, d/d farmer's nearest station in March.
Ammonium Sulphate.—Per ton in 6-ton lots, d/d farmer's near- est station March/June, £10 2s.
Calcium Cyanamide.—Nominal; supplies very scanty.
Concentrated Complete Fertiliser's.—£14 8s. 9d. per ton in 6-ton lots d/d farmer's nearest station in March. Supplies small except C.C.F. Special.
"Nitro Chalk."—£9 14s. per ton in 6-ton lots, d/d farmer's nearest station in March.
Sodium Nitrate.—Chilean super-refined for 6-ton lots d/d near- est station, £15 5s. per ton; granulated, over 98%, £14 10s. **per ton. Surcharges for smaller quantities unless collected at warehouse or depots.**

Coal Tar Products

Benzol.—Industrial (containing less than 2% of toluol), 2s. 4d. per gal., ex works.
Carbolic Acid.—Crystals, 10d. per lb. Crude, 60's 3s. 9d. to 4s. 6d., according to specification. MANCHESTER: Crystals, 9¾d. to 11½d. per lb., d/d; crude, 4s. to 4s. 6d., naked, at works.
Creosote.—Home trade, 6¼d. to 9d. per gal., f.o.r., maker's works; exports 6d. to 6¼d. per gal., according to grade. **MANCHESTER: 6¼d. to 9d. per gal.**
Cresylic Acid.—Pale, 99/100%, 5s. 6d. per gal. MANCHESTER: Pale, 99/100%, 5s. 6d. per gal.
Naphtha.—Solvent, 90/160°, 2s. 5d. to 2s. 9d. per gal.; heavy, 90/190°, 1s. 10½d., naked at works. MANCHESTER: 90/160°, 2s. 5d. to 2s. 10d.
Naphthalene.—Crude, whizzed or hot pressed, £11 3s. to £11 8s. per ton; purified crystals, £19 to £36 per ton in 2-cwt. bags; flaked, £28 to £35 per ton. Fire-lighter quality, £7 10s. to £9 10s. per ton ex works. MANCHESTER: Refined, £19 to £38 per ton.
Pitch.—Medium, soft, nominal, f.o.b. MANCHESTER: 42s. 6d. per ton at works.
Pyridine.—90/140°, 18s. per gal.; 90/160°, 13s. 6d. MANCHESTER: 14s. to 18s. 6d. per gal.
Toluol.—Pure, 2s. 5d. nominal; 90's, 1s. 10d. per gal. MANCHESTER: Pure, 2s. 5d. per gal. naked.
Xylol.—Commercial, 3s. 3d. per gal.; pure, 3s. 6d. MANCHESTER: 3s. to 3s. 5d. per gal.

Wood Distillation Products

Calcium Acetate.—Brown, £21 per ton; grey, £24. MANCHESTER: Grey, £25 to £26 per ton.
Methyl Acetone.—40.50%, £54 per ton.
Wood Creosote.—Unrefined, about 2s. per gal., according to boiling range.
Wood Naphtha, Miscible.—4s. 6d. to 5s. per gal.; solvent, 5s. per gal.
Wood Tar.—£4 to £5 per ton, according to quality.

Intermediates and Dyes (Prices Nominal)

m-**Cresol** 98/100%.—Nominal.
o-**Cresol** 30/31° C.—Nominal.
p-**Cresol** 34/35° C.—Nominal.
Dichloraniline.—2s. 8½d. per lb.
Dinitrobenzene.—8½d. per lb.
Dinitrotoluene.—48/50° C., 9½d. per lb.; 66/68° C., 1s.
p-**Nitraniline.**—2s. 5d. per lb.
Nitrobenzene.—Spot, 5½d. per lb., in 90-gal. drums, drums extra, 1-ton lots d/d buyer's works.
Nitronaphthalene.—1s. 2d. per lb.; P.G., 1s. 0½d. per lb.
o-**Toluidine.**—1s. per lb., in 8/10 cwt. drums, drums extra.
p-**Toluidine.**—2s. 2d. per lb., in casks.
m-**Xylidine Acetate.**—4s. 5d. per lb., 100%.

Latest Oil Prices

LONDON.—March 18.—For the period ending March 28, per ton, net, naked, ex mill, works or refinery, and subject to additional charges according to package and location of supplies:—LINSEED OIL, raw, £41 10s. RAPESEED OIL, crude, £46 5s. COTTONSEED OIL, crude, £31 2s. 6d.; washed, £34 5s.; refined edible, £35 12s. 6d.; refined deodorised, £36 10s. SOYA BEAN OIL, crude, £33; refined deodorised, £37. COCONUT OIL, crude, £28 2s. 6d.; refined deodorised, £31 7s. 6d. PALM KERNEL OIL, crude, £27 10s.; refined deodorised, £30 15s. PALM OIL, refined deodorised, £37; refined hardened deodorised, £41. GROUNDNUT OIL, crude, £35 10s.; refined deodorised, £40. WHALE OIL, crude hardened, 42 deg., £30 10s.; refined hardened, 42 deg., £33. ACID OILS.—Groundnut, £19; soya, £17; coconut and palm kernel, £22 10s. ROSIN, 26s. 6d. to 33s. per cwt., ex wharf, according to grade. TURPENTINE, American, 90s. per cwt., in drums or barrels, as imported (controlled price).

General News——————From Week to Week

When it comes to saving paper, even the smallest scraps count. Five visiting cards, for example, make one washer; and eight old envelopes are enough for one cut-out target.

The Department of Metallurgy of the University of Manchester has received a grant of £350 from the Iron and Steel Institute. This is an increase of £100 over last year's grant.

Among new members elected to the American Chamber of Commerce in London is included the name of The Aluminium Plant and Vessel Co., Ltd., Point Pleasant, S.W.18.

A special department of the Miscellaneous Chemicals Control at Terminal House, 52 Grosvenor Gardens, London, S.W.1, has been set up to deal with that proportion of the increasing number of raw materials for which the Control is responsible which are required by the paint industry.

The head office of the Chemical Workers' Union is now at Dalton House, 155 Kennington Park Road, London, S.E.11 (Tel.: RELiance 3938). The new offices are named after John Dalton, with the approval of his living descendants, in memory of his outstanding contributions to chemical science.

No award of the Worshipful Company of Dyers' Research Medal is being made this year, the committee of adjudication having reported that none of the papers submitted to the Society of Dyers and Colourists reached the necessary standard, though two or three only just fell short of it.

A summary of British and American specifications for non-ferrous metals has been provided by the British Standards Institution in their B.S. 1007 (11s. post free). It includes 35 tables for aluminium and its alloys, copper, copper alloys, nickel, nickel-copper alloys, lead, tin, and zinc, and covers all forms of metal: sheets, bars, rods, ingots, castings, wire, etc.

Nominations are invited, by the Committee of the Chemical Engineering Group, Society of Chemical Industry, to fill up four vacancies on the Committee created by the retirement of Messrs. J. M. Macqueen, S. J. Tungay, and I. E. Weber, and the death of the late S. G. M. Ure. Nominations should reach the secretary of the Group by March 27.

In reply to a question in the House of Commons last week, the Under-Secretary of State for the Colonies stated that information was not available regarding the annual cost of the Board established under the Kenya Pyrethrum Ordinance, 1938, nor could he say what was the annual income from licence fees for the growth of pyrethrum nor how many licences were issued during the last year for which figures were available.

Wholesale prices in February for industrial materials and manufactures stood at 159, as measured by the Board of Trade index number (1930 = 100). This makes a rise of 0.3 per cent. over January and of 5.7 per cent. over February, 1941. The figure for chemicals and oils was 132.6 (January, 130.4), for non-ferrous metals 125.4 (January, same), and for iron and steel 181.7 (same). The price of paint was advanced by about 3½ per cent. by the middle of the month.

Memorandum No. 970A of the British Standards Institution, the issue of which was announced in our last number, takes a further step in the co-ordination of the British steel industry. In future all wrought and special alloy steels supplied are to be made to a selected list of 44 of the 58 steels in the "En" series mentioned in B.S. 970. The memorandum explains the Direction made by the Iron and Steel Control and sets out the steels actually available.

The Food Substitutes (Control) Order, 1941, prohibits the sale of any food substitute unless it has been manufactured under and in accordance with the terms and conditions of a licence granted for the purposes of the Order. Up to the present the Minister of Food has refrained from strict enforcement of the Order with a view to enabling wholesalers and retailers to dispose of stocks of the food substitute already in their hands, notwithstanding that the conditions attaching to the manufacturer's licence are not strictly complied with. Notice is now given that after March 31 next compliance with the terms of the Order will be strictly enforced.

The Board of Trade has, with the approval of the Treasury, decided to fix the rate of business premium, under the War Damage Act for the whole of the year to September 30, 1942, at 20s., so that the premium to be paid for the remaining six months ending September 30, will be 5s. per cent. This premium will be payable in one sum and one policy will be issued for the whole six months' period.

Foreign News

In Mexico the export of aluminium, calcium carbide, amorphous phosphorus, medicinal products, and bone is now subject to the issue of export permits by the Department of National Economy.

Mercury production in November last in the U.S.A. was approximately 3800 flasks. Consumption of the virgin metal fell to 3900 flasks in November from the record figure of 4800 in the previous month. Nominal prices rose from $195-197 per flask, New York, to $197-199 at the end of November.

The production of synthetic rubber in Italy is reported to have started in one of the two factories which were to engage in the industry according to earlier plans. One of them was to use the I.G. patents for Buna, while the other plant was to work by an Italian process. The Pirelli company is interested in the synthetic rubber industry, which also receives support from the Italian Government.

Factories which will render Australia self-supporting, in respect of nitric acid and methanol, are to be erected, according to a statement made by the Commonwealth Minister of Munitions. Two will be established in Victoria and one each in New South Wales and South Australia, in each case adjoining Government explosives factories. The expenditure of £A2,500,000 involved was calculated to meet an annual requirement of the two essential commodities amounting to £A1,000,000.

Under an order of the U.S. Office of Production Management no person other than the Metals Reserve Co. and any other U.S. Government department, agency or corporation, shall, without the written authorisation of the Director of Priorities of the O.P.M., make any contract or other arrangement for the importation of antimony, asbestos, cadmium, chromium, coconut palm oil, copper, graphite or plumbago (crystalline flake), hides and skins, kyanite and sillimanite, lead, quicksilver or mercury, rapeseed oil, rutile, tungsten, tung oil, vanadium, zinc, or zirconium.

Forthcoming Events

A meeting of the London Section Committee of the **British Association of Chemists** will be held in the Lecture Room of the Pharmaceutical Society, 17 Bloomsbury Square, W.C.1, on **March 23,** at 6.30 p.m. Dr. J. G. Fife, B.Sc., M.Sc., F.I.C., will give a paper on "Patent Law."

There will be a meeting of the **Royal Institution of Great Britain** at 21 Albemarle Street, W.1, at 2.30 p.m., on **March 26,** when Sir Lawrence Bragg will be speaking on "Physicists after the War."

At a joint meeting of the Food Group with the Bristol Section of **The Society of Chemical Industry,** to be held in the Chemical Department of the Bristol University, at 6.30 p.m., on **March 26,** Professor F. L. Engledow will deliver a lecture on "Science and the Land."

The annual corporate meeting of the **Institution of Chemical Engineers** will be held, on **March 27,** in the Connaught Rooms, Great Queen Street, London, W.C.2. The meeting, which will be on similar lines to that of last year, will open at 11 a.m., and the President will deliver his address, on "Chemical Engineering and Ceramics," at approximately 11.45 a.m. Luncheon will be served at 12.45 for 1 p.m.

The annual business meeting of the Nottingham Section of **The Society of Chemical Industry** will be held at 2.45 p.m., on **March 28,** and this will be followed, at 3 p.m., by a talk on "The Clay Industry," by Mr. G. N. Hodson, of Hathernware, Limited.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

GENERAL CHEMICAL AND PHARMACEUTICAL CO., LTD., Wembley. (M., 21/3/42.) Feb. 26, £700 mortgage and £1000 charge, both to Miss G. M. Maddison, Chislehurst, charged on works and land adjoining and land and appurtenances respectively. *£1200. Nov. 25, 1941.

MANCHESTER OIL REFINERY, LTD., London, E.C. (M., 21/3/42.) Feb. 10, letter of charge securing to N. M. Rothschild and Sons £300,000 (not ex.) including sums due or to become due to the chargee by Manchester Transformer Oil, Ltd., and/or British Transformer Oil and Lubricants, Ltd.; charged on contract moneys, etc. *£285,352. Jan. 13, 1942.

BRITISH TRANSFORMER OIL AND LUBRICANTS, LTD., Barton (Lancs.). (M., 21/3/42.) Feb. 10, letter of charge securing to N. M. Rothschild and Sons all moneys due to the chargee by Manchester Oil Refinery, Ltd. (not ex.). £300,000 including sums due or to become due by the company and/or Manchester Transformer Oil, Ltd.; charged on contract moneys, etc. *Nil. May 12, 1941.

MANCHESTER TRANSFORMER OIL, LTD., Barton, (Lancs.). (M., 21/3/42.) Feb. 10, letter of charge securing to N. M. Rothschild and Sons all moneys due or to become due to the chargee by Manchester Oil Refinery, Ltd. (not ex.). £300,000 including sums due or to become due to the chargee by the company and/or British Transformer Oil and Lubricants, Ltd. charged on contract moneys, etc. *Nil. April 16, 1941.

Company News

The Ruberoid Co., Ltd., report net profit for 1941, after taxation, of £56,303 (£48,411), and have declared a final dividend of 6 per cent., making 8 per cent. for the year (same).

Yorkshire Indigo Scarlet and Colour Dyes report net profit for 1941 of £7199 (£9334) and have declared a dividend for two years (same) to December 31, 1937, on 5 per cent. cumulative preference shares.

New Companies Registered

Guests (Chemists), Ltd. (372,584).—Private company. Capital £500 in 500 shares of £1 each. Manufacturers of and dealers in chemicals, plasters, disinfectants, fertilisers, oils, colours, etc. Directors: Mary A. Guest; Esther Guest. Registered Office: 422, Bury New Road, Prestwich.

Cosma, Ltd. (372,403).—Private company. Capital: £1000 in 1000 shares of £1 each. Manufacturers of and dealers in pharmaceutical products, chemicals, disinfectants, fertilisers, oils, pigments, varnishes, dyes, etc. Subscribers: F. H. Reed; H. G. Williams. Registered office: Danes Inn House, 265 Strand, W.C.2.

Rovex Manufacturing Co., Ltd. (372,627).—Private company. Capital £1000 in 800 ordinary and 200 5 per cent. non-cumulative preference shares of £1 each. Manufacturers of and dealers in oils, lubricants, grease, tallow, paraffin, tar, bitumen, petroleum, wax, oil fuels, etc. Directors: P. Vanetzian; A. Vanetzian. Registered Office: 31, King's Road, S.W.3.

Seatex, Ltd. (372,355).—Private company. Capital: £1000 in 1000 shares of £1 each. Manufacturers of and dealers in metal goods, engineering appliances, chemical substances, plastic materials, etc. Directors: A. M. Marlow; W. Smith; R. R. Dowson. Registered office: Lloyds Bank Chambers, Kingsway, Dovercourt, Essex.

Acid and Alkaline Company, Ltd. (372,360).—Private company. Capital: £1050 in 1010 shares of £1 each and 800 shares of 1s. each. Manufacturers, renewers of and dealers in electric batteries and parts theerof, electro-platers, electro-chemical manufacturers, etc. Subscribers: H. W. Fisher; P. Feldman. Registered office: "Rylstone," Holders Hill Crescent, Hendon, N.W.4.

Philip Sowerby and Sons, Ltd. (372,351).—Private company. Capital: £1000 in 1000 shares of £1 each. Manufacturers of and dealers in oils, lubricants, grease, tallow, tar, bitumen, wax, oil, and other fuels, etc. Directors: P. Sowerby; Edith Sowerby; Edith Taylor; H. Jones. Registered office: Dearnley Oil Works, Arm Road, Dearnley, Littleborough, Lancs.

R. Carver and Company, Ltd. (372,435).—Private company. Capital: £500 in 500 shares of £1 each. Manufacturers of and dealers in germicides, insecticides, sprays, fumigants, disinfectants, manures, oils, glues, dyes, varnishes, etc. Subscribers: A. E. Marten; M. C. George, C.A. Registered office: Bristol House, 19/20 Holborn Viaduct, E.C.1.

Chemical and Allied Stocks and Shares

IN the continued absence of improvement in the volume of business, no very definite trend has been observable in the stock and share markets, although the general undertone was reasonably steady. The satisfactory tendency maintained in British Government securities again aided sentiment, but the main market factor was the general disposition to await the next turn in war developments. Industrial shares attracted very little attention, but there was no appreciable selling, and movements on balance were small and unimportant.

B. Laporte remained firmly held and were again 63s. 9d. Borax Consolidated deferred were steady at 29s., having continued under the influence of the results, it being realised that the 7½ per cent. dividend is conservative, as actual earnings on the deferred units last year were slightly over 15 per cent. British Match were a few pence easier at 34s. 9d., awaiting the forthcoming results of the Bryant and May subsidiary. Barry and Staines were marked lower to 31s. 10½d., and Nairn and Greenwich remained at the reduced level of 56s. 3d. made last week. United Molasses at 29s. 9d. were within a few pence of the price ruling a week ago, but the units of the Distillers Co. maintained a steady appearance at 74s. 9d., general expectations being that the dividend on the last-named may be maintained at 16¼ per cent. Murex kept at the lower level of 87s. 6d., the disposition being to await the forthcoming interim dividend announcement. At the time of writing, Turner and Newall have gone back from 68s. 1½d. to 67s. Lever and Unilever were unchanged on balance at 25s. 9d., but Dunlop Rubber and a number of other shares were again lower on uncertainty as to what extent future earnings will be affected by war developments in the Far East.

There was a very firm undertone in Imperial Chemical, which at 32s. 3d. were virtually the same as a week ago, sentiment having continued to be assisted by hopes that the dividend total may again be 8 per cent. Last year, it may be recalled, the final dividend was announced on April 9. I.C.I. 7 per cent. preference have further improved, the current price of 35s. 9d. being 6d. above that ruling a week ago. On the other hand, Associated Cement were lower at 46s. 3d., on market expectations that the forthcoming results are likely to show a lower dividend. Most other shares of companies identified with the building trades were also reactionary owing to the recommendation of a cut in output to free men for the national effort. British Plaster Board shares at 21s. 6d. were, however, little changed on balance. Awaiting the results, General Refractories have remained at 8s. 10½d. at the time of writing, while, aided by the dividend announcements, Valor shares at 31s. 3d., and Cooper McDougall at 24s. 4½d., were also unchanged on balance. Elsewhere, Fison Packard were a few pence higher at 40s., but as in many other instances, quotations have not been tested by many dealings this week. Pending the dividend decisions, British Oxygen were 67s. 9d., and British Aluminium 44s., while Amalgamated Metal shares were 12s. 9d.

Iron and steel issues were inclined to improve, sentiment having reflected the resumption of dividends by Guest Keen Baldwins Iron and Steel. The shares of the controlling companies were steady, Guest Keen being 21s. 6d. and Baldwins 5s. Allied Ironfounders had a firm appearance at 24s. Elsewhere, United Steel were better at 22s. 9d., while Stewarts and Lloyds were 45s. 7½d., and Tube Investments 81s. 6d.

British Drug Houses improved to 26s. 3d., which compares with 25s. a week ago, while Boots Drug 5s. units have been steady at 32s. 9d., as have Sangers at around 16s. and Timothy Whites at 18s. 7½d. In other directions, Greeff-Chemicals 5s. units continued to be quoted at 5s. 7½d., and Monsanto Chemicals 5½ per cent. preference were again 22s. 6d. British Industrial Plastics 2s. shares were quoted at 3s. 3d., and Erinoid 5s. ordinary at around 7s. 9d. Among oil shares, Burmah Oil and Anglo-Iranian were again lower, but "Shell" were inclined to improve.

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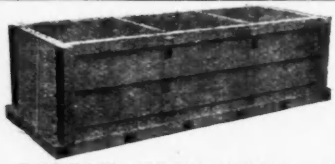

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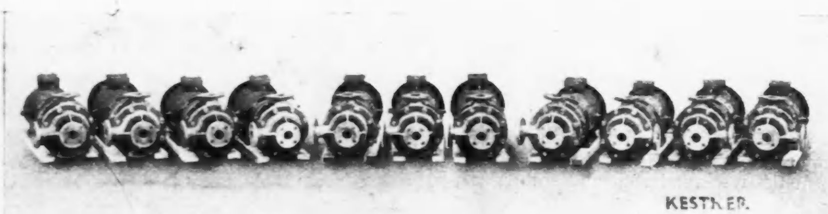

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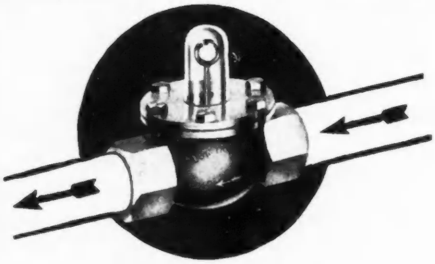

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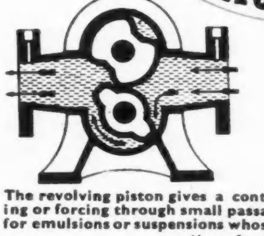

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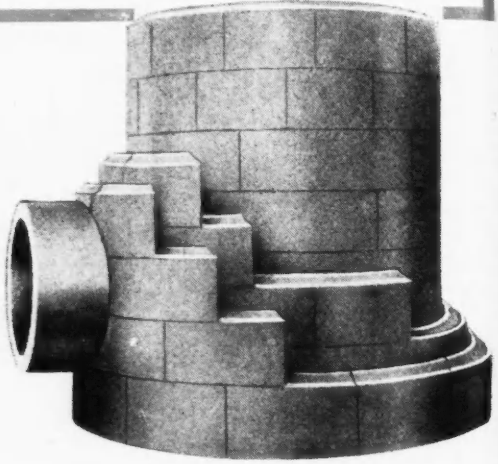

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